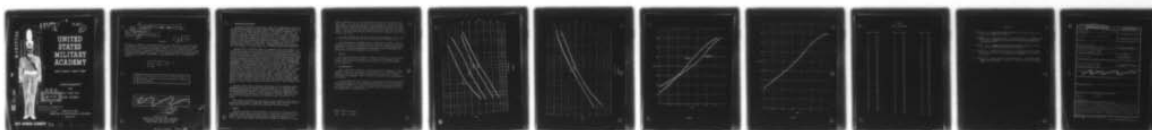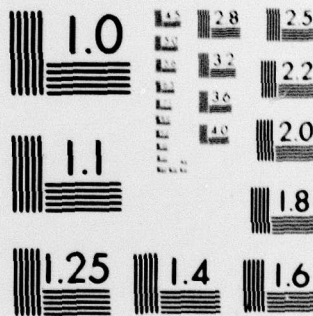AD-A077 793   MILITARY ACADEMY   WEST POINT NY OFFICE OF THE DIRECTO--ETC   F/G 5/9
                COMPARABILITY OF ACT AND SAT TEST SCORES, (U)
                JUN 75   G W MEDSGER
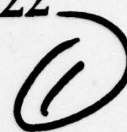UNCLASSIFIED   1A4.00-75-022   NL

AD
A077793

END
DATE
FILMED
1-80

DDC

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

LEVEL
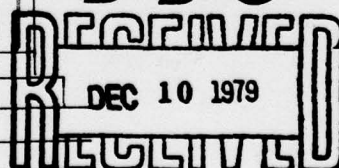
75-022

UNITED STATES MILITARY ACADEMY

WEST POINT · NEW YORK

COMPARABILITY

OF

ACT AND SAT

TEST SCORES

D D C

RECEIVED

DEC 10 1979

A

OFFICE OF THE

DIRECTOR OF INSTITUTIONAL RESEARCH

JUNE 1975

DUTY-HONOR-COUNTRY   79 20   9 214

COMPARABILITY OF ACT AND SAT TEST SCORES

Report No. 1A4.00-75-022
Task No. 2107
Prepared by: COL Gerald W. Medsger
June 1975

ABSTRACT

Attempting to adhere to the present scheme of the ABDQC when using both the ACT and SAT batteries presents some inherent problems. Unlike the problem of equivalent scores, the problem of comparable scores is one of "equating" tests of different function or emphasis. Consequently, direct conversions from ACT to SAT scores should be avoided if possible. This report presents a curvilinear method of equating ACT-E/SAT-V, ACT-M/SAT-M, and ACBA/CBA for use in the admissions process.

Jun 75

NOTE: Any conclusions in this report are not to be construed as official U. S. Military Academy or Department of the Army positions unless so designated by other authorized documents.

Accession For
NTIS GRA&I
DDC TAB
Unannounced
Justification

By
Distribution/
Availability Codes
Dist   Avail and/or
          special

OFFICE OF THE
DIRECTOR OF INSTITUTIONAL RESEARCH
UNITED STATES MILITARY ACADEMY
WEST POINT, NEW YORK 10996

406247

1. Background and Purpose

Attempting to adhere to the present scheme of the ABDQC when using both the ACT and SAT batteries presents some inherent problems because these test batteries do not measure the same things.[1] The matter of "equating" non-parallel tests has been reviewed extensively elsewhere.[2] Even tests that purport to measure competence in the same subject will differ in emphasis. Unlike the problem of *equivalent* scores which is restricted to the case of parallel tests, the problem of *comparable* scores is a probelm of "equating" tests of different psychological function or emphasis. Two tests are comparable (with respect to a particular group of examinees) only if the distributions of scores are identical. Comparability may hold reasonably well with respect to another group if it is drawn from the same population.

Methods used to establish tables of comparable scores are numerous, including both linear and non-linear methods, but none are satisfactory. The method used by Marron in providing the Director of Admissions with scores to be used as determinant handicaps and for College Board Averages (CBA) was to convert linearly the ACT score distributions so that new distributions would have the same means and standard deviations as the SAT score distributions.[3] A regression technique was used by Gordon in a recent issue of College and University.[4] This technique, however, suffers from two faults. First, the solution is not unique because there are two regression lines, one for predicting SAT from ACT and one for predicting ACT from SAT. For example, using Gordon's formulas, the best estimate of a person's ACT-E given a score of 450 on SAT-V is 20.4; however, given a score of 20.4 on ACT-E, the best estimate of his score on SAT-V is 465.4, not 450. The discrepancy gets worse as one gets farther from the mean score. Secondly, the linear regression method introduces bias because (given a prediction equation of the form $Y = aX+b$) individuals scoring below the mean on Test X would be given higher scores on Test Y, closer to the mean; and individuals scoring above the mean on Test X would be given lower scores on Test Y, also closer to the mean.

Because of this lack of symmetry, and because of the regression effect described above, the regression technique probably is not suitable when merging and comparing of scores on both sets of tests are required--as in the USMA admissions process. A better method of defining comparable scores is to administer the two tests to the same basic reference group and then use one of the accepted techniques of equating scores for parallel test forms.

This study was conducted at the request of the Director of Admissions to provide a better table of comparable scores between SAT-V and ACT-E and between SAT-M and ACT-M for use in the admissions selection process.

2. Method

Subjects consisted of 2196 candidates to the Class of 1978 who had all four ACT-E, ACT-M, SAT-V, and SAT-M scores. Noting that the ACT score distributions were considerably more negatively skewed than those for the SAT's, a curvilinear analog (equipercentile) method of equating was used to

define comparable scores for ACT-E/SAT-V, ACT-M/SAT-M, and ACBA/CBA,* respectively.[5] For each pair of test score distributions, percentile ranks were computed, plotted and smoothed. Corresponding percentiles were used from the curves for both tests and plotted one against the other on graph paper. The curve connecting these plotted points was smoothed and extrapolated. The resulting curve was used to record the conversion from one test score to the other.

The same technique was applied to nearly 6,000 candidates for the Class of 1978 having either SAT-V or ACT-E and either SAT-M or ACT-M scores.

This methodology is somewhat similar to that used by Marron. However, he used only entrants to USMA rather than candidates, and his results depended not only on SAT scores but also on the use of College Board Achievement Tests. Further, his method was based upon a linear transformation, whereas the actual distributions are curvilinear.

3. Results

The resulting curves are shown in Figures 1 through 4. The final conversion tables are given in Table I. The results for candidates with either, but not both, scores gave almost identical results and therefore are not reported.

4. Recommendations

Direct conversions from ACT to SAT scores should be avoided if at all possible. When such conversions are required, it is recommended that the conversion tables in this report be used. Specifically, the following handicaps are recommended: low in English, 18 in ACT-E; low in mathematics, 22 in ACT-M.

It bears repeating that no method of equating ACT and SAT scores will be entirely satisfactory. From a psychometric standpoint, it would be better to review the ABDQC with a view toward eliminating the need for handicaps and the CBA score. In any event, conversion tables should not be used in the computation of the ACEER score.
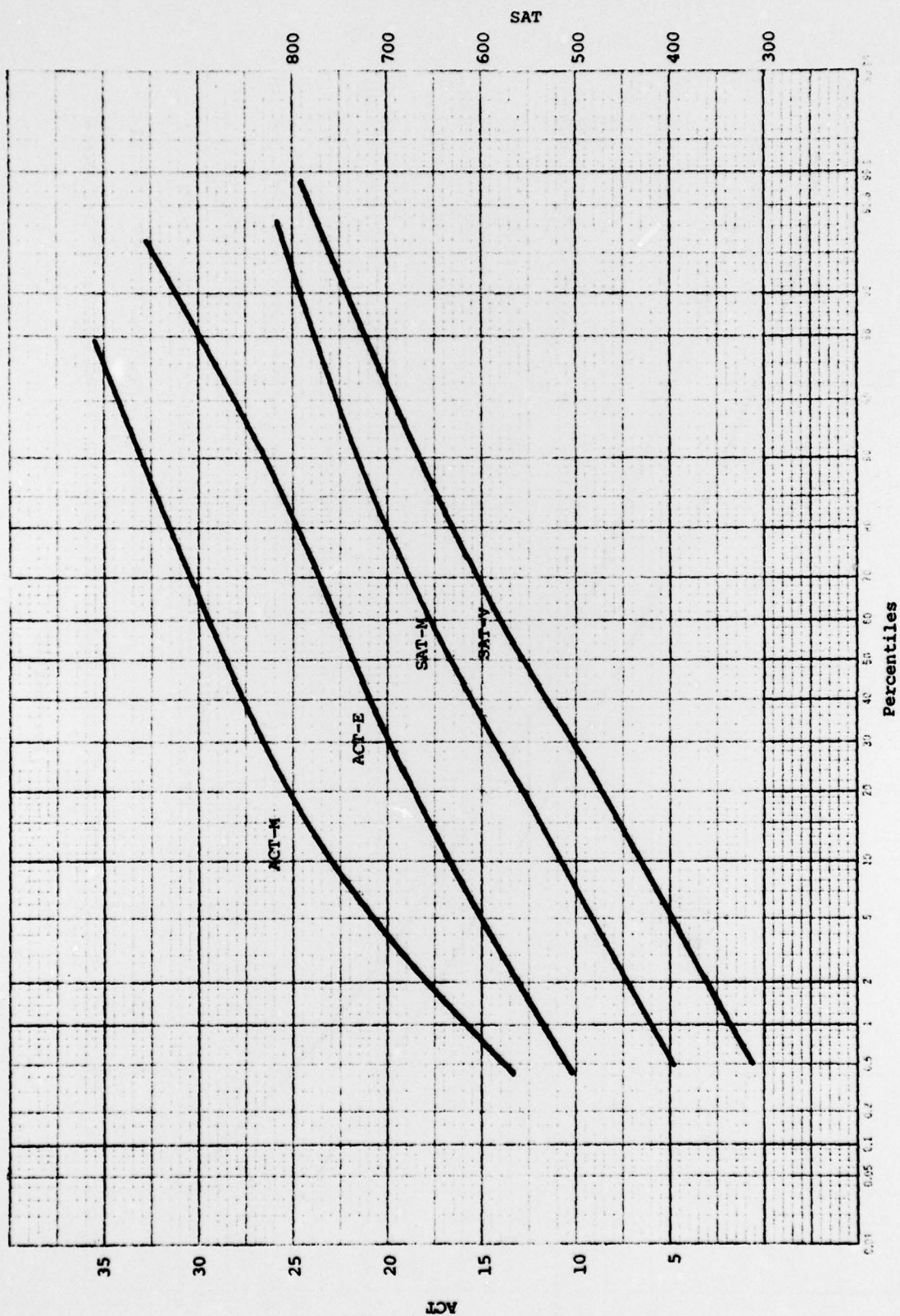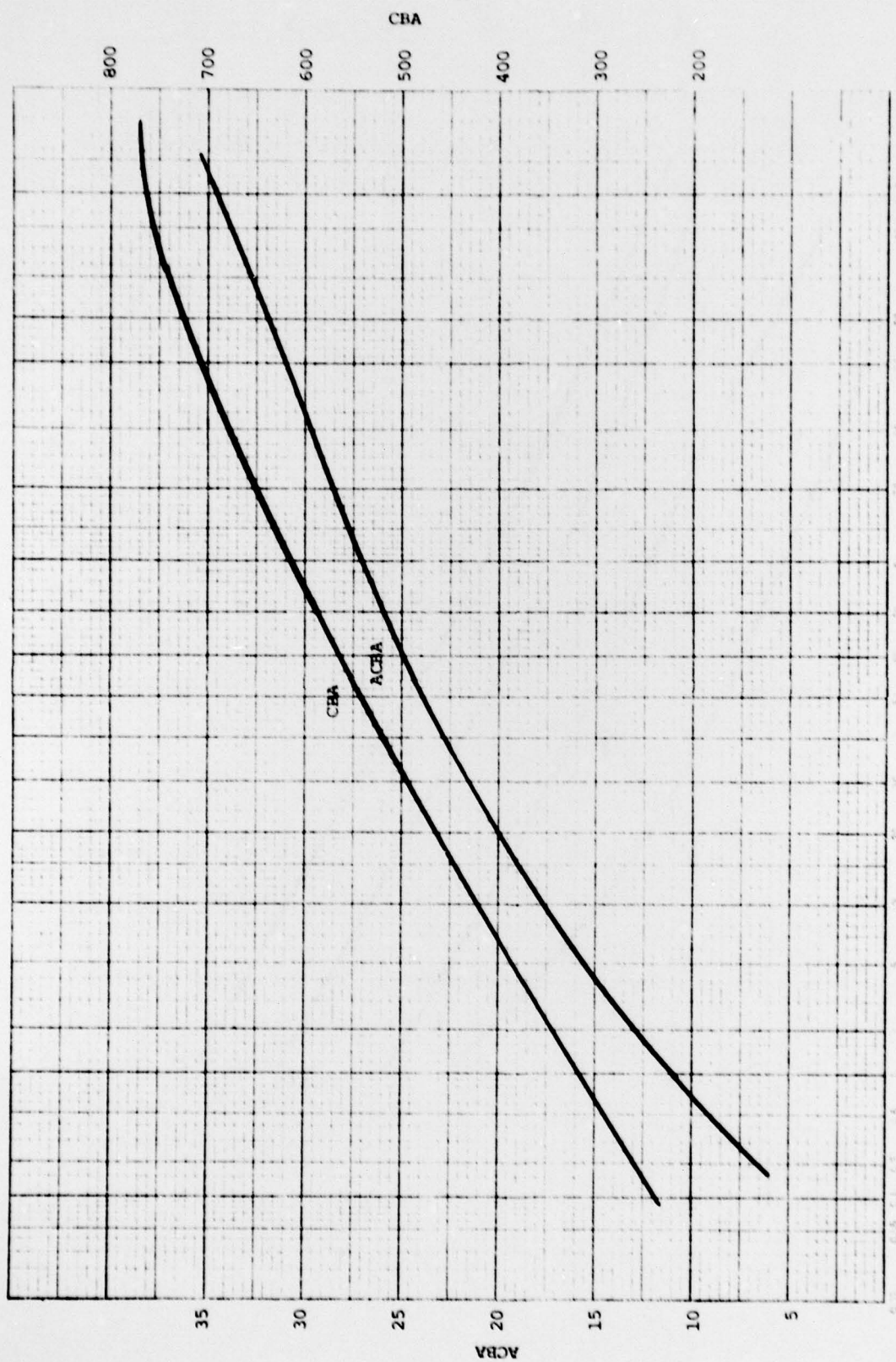
---

*ACBA = (ACT-E + ACT-M)/2
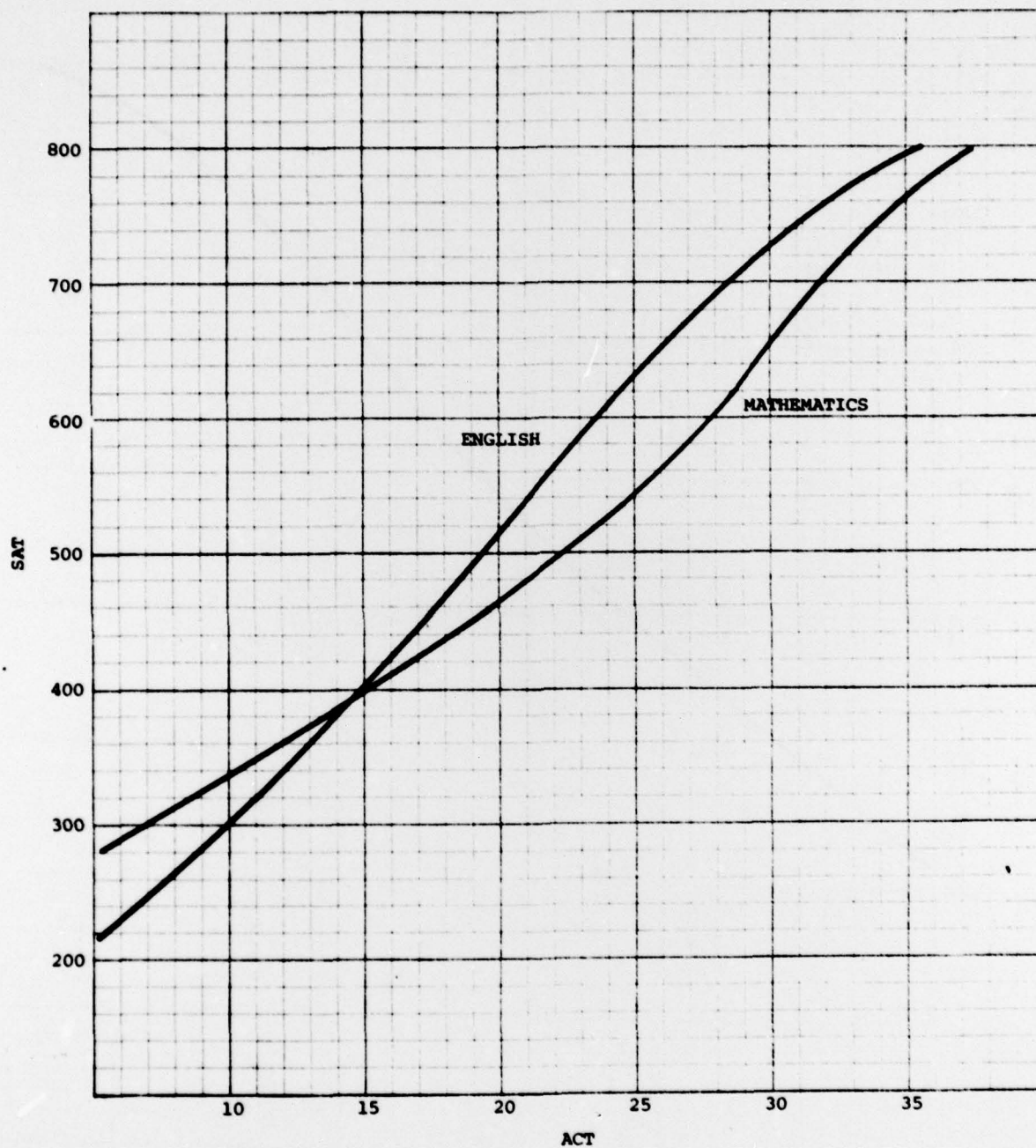
 CBA = (SAT-V + SAT-M)/2

FIGURE 1

3

FIGURE 2

FIGURE 3

5

FIGURE 4
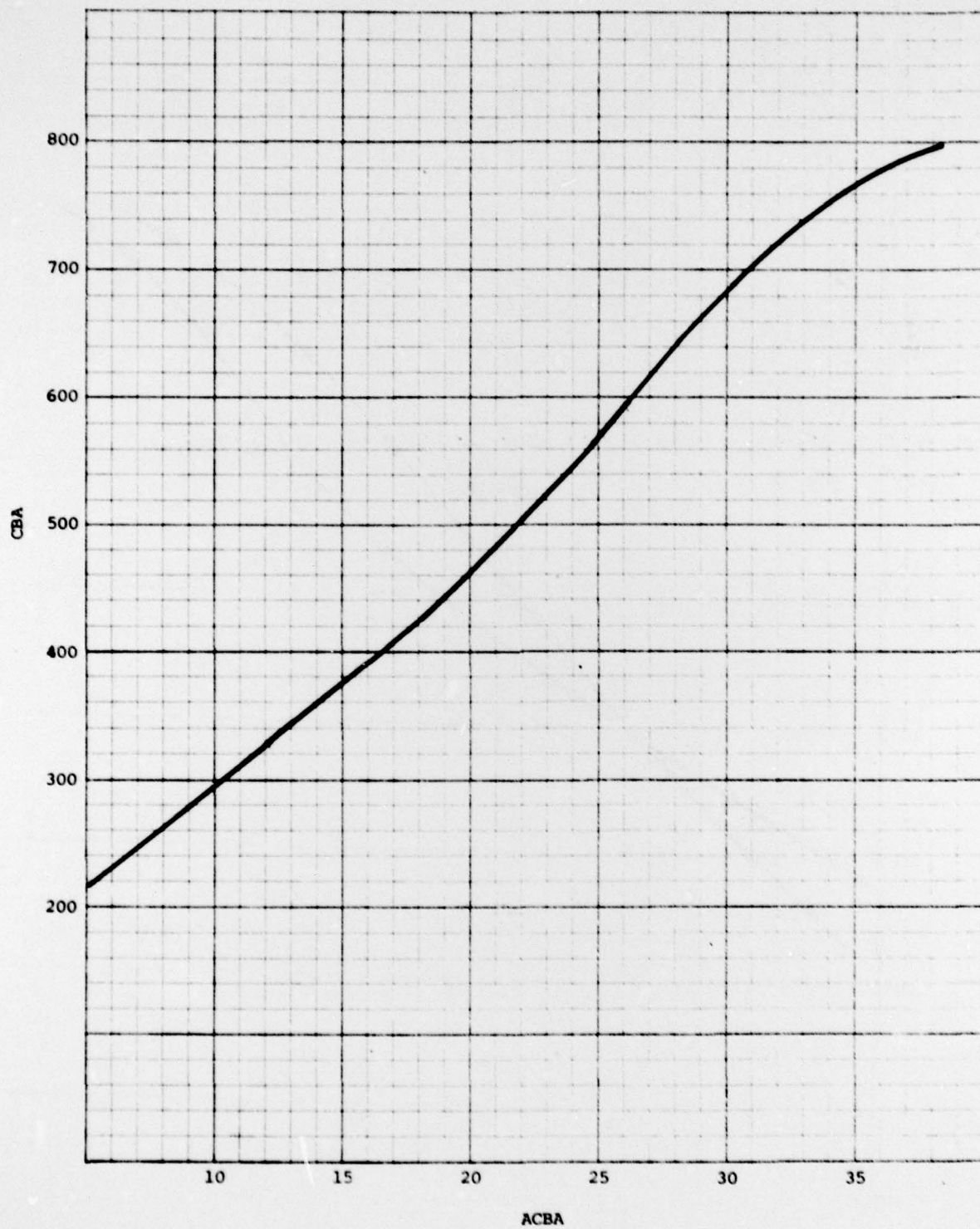
6

TABLE I

TABLE OF CONVERSIONS

ACT-E to SAT-V		ACT-M to SAT-M		ACBA to CBA	
5	220	5	280	5	215
6	235	6	290	6	230
7	250	7	305	7	250
8	275	8	315	8	265
9	285	9	330	9	280
10	305	10	340	10	295
11	320	11	350	11	310
12	340	12	365	12	325
13	360	13	375	13	340
14	380	14	390	14	365
15	400	15	400	15	375
16	420	16	415	16	390
17	440	17	425	17	410
18	460	18	440	18	425
19	485	19	450	19	440
20	510	20	465	20	465
21	530	21	480	21	480
22	560	22	495	22	500
23	585	23	510	23	510
24	610	24	530	24	525
25	635	25	545	25	565
26	650	26	465	26	590
27	670	27	490	27	610
28	690	28	510	28	640
29	705	29	535	29	660
30	725	30	560	30	685
31	740	31	580	31	700
32	755	32	710	32	720
33	770	33	730	33	740
34	785	34	750	34	755
35	795	35	770	35	770
36	800	36	785	36	780
		37	800	37	790
				38	800

References

1. Medsger, G. W. From CEER to ACEER, Report 1A3.09-72-036, Office of In-
     stitutional Research, June 1972.

2. Lundquist, E. F., Equating scores on non-parallel tests. In Mehrens and
     Ebel (Eds), Principles of Education and Psychological Measurement.
     Rand-McNally; 1967.

3. Marron, J. E. A Computer Assisted Selection System, Report 1A3.08-72-
     038, Office of Institutional Research, June 1972.

4. Gordon, M. A. Correlation and Regression for ACT and SAT Test Scores,
     College and University, The Journal of the AACRAO, Vol. 50, No. 1,
     Fall 1974.

5. Angoff, W. H. Scales, Norms and Equivalent Scores. In Thorndike (Ed)
     Educational Measurement, 2d Edition. American Council on Education,
     1971.

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER 1A4.00-75-022	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Comparability of ACT and SAT Test Scores		5. TYPE OF REPORT & PERIOD COVERED
		6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) COL Gerald W. Medsger		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Office of the Director of Institutional Research United States Military Academy West Point, New York 10996		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS Task No. 2107
11. CONTROLLING OFFICE NAME AND ADDRESS Same as #9 above.		12. REPORT DATE June 1975
		13. NUMBER OF PAGES 9 + i
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office) United States Military Academy West Point, New York 10996		15. SECURITY CLASS. (of this report) Unclassified
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Reproduction of this document in whole or in part must have prior approval of the Superintendent, United States Military Academy, West Point, New York.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

ACT	Scores
Admissions	Tests
CEEB	
Class of 1978	
Psychometrics	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Attempting to adhere to the present scheme of the ABDQC when using both the ACT and SAT batteries presents some inherent problems. Unlike the problem of equivalent scores, the problem of comparable scores is one of "equating" tests of different function or emphasis. Consequently, direct conversions from ACT to SAT scores should be avoided if possible. This report presents a curvilinear method of equating ACT-E/SAT-V, ACT-M/SAT-M, and ACBA/CBA for use in the admissions process.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE